

What is claimed:

1. A semiconductor isolation structure comprising:

a substrate, the substrate comprising a surface;

a first device and a second device formed within the substrate;

an isolation region formed within the substrate between the first device and the second device, the isolation region comprising:

a deep region which extends into the substrate, the deep region comprising a deep region cross-sectional area;

a shallow region which extends to the surface of the substrate, the shallow region comprising a shallow region cross-sectional area; wherein

the deep region cross-sectional area is greater than the shallow region cross-sectional area.

2. The semiconductor isolation structure as recited in claim 1, wherein the isolation region comprises an oxide.

3. The semiconductor isolation structure as recited in claim 1, wherein the shallow region comprises a protective outer wall adjacent to the substrate.

4. The semiconductor isolation structure as recited in claim 1, wherein the protective outer wall comprises a layer of Nitride.

1 5. A semiconductor isolation structure comprising:

2 a substrate, the substrate comprising a surface;

3 a first device and a second device formed within the substrate;

4 an isolation region formed within the substrate between the first device and the second
5 device, the isolation region comprising:

6 a deep region which extends into the substrate, the deep region comprising an
7 oxide;

8 a shallow region which extends to the surface of the substrate, the shallow region
9 comprising a protective wall.

10 6. The semiconductor isolation structure of claim 5, in which the protective wall comprises an
11 oxide wall and a nitride wall.

12 7. A method of forming an isolation structure within a substrate, the method comprising:

13 forming a trench in the substrate;

14 forming a protective wall layer within the trench;

15 removing a bottom portion of the protective wall layer exposing a surface of the
16 substrate;

17 directly oxidizing the exposed surface of the substrate;

18 filling the trench with oxide; and

19 polishing the oxide.

1 8. The method of forming an isolation structure within a substrate of claim 7, wherein the step of
2 forming a protective wall within the trench comprises:

3 growing an oxide layer on a surface of the trench; and

4 depositing a nitride layer over the oxide layer.

1 9. The method of forming an isolation structure within a substrate of claim 7, wherein the step of
2 removing a bottom portion of the protective wall layer exposing a surface of the substrate
3 comprises:

4 removing a bottom portion of the protective wall layer exposing the substrate; and

5 forming a second trench in the exposed substrate forming an exposed surface.

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